

Exp 311

Experiment Using Variational Parameters

Aim: To implement and evaluate a variational Autoencoder.
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Objective:

- 1.) Understand the architecture and working of a Variational Autoencoder.
 - 2.) Train the VAE on image dataset (eg:- MNIST).
 - 3.) Extract latent - Space features from the encoder.
 - 4.) Train classifier using latent features.
 - 5.) Evaluate the model.

Pseudocode:-

- 1.) Import required libraries -
 - 2.) Load dataset
 - 3.) Define VAE architecture.
 - Encoder - maps input \rightarrow mean (μ) and log variance ($\log \sigma$)
 - Decoder - reconstructs image from z .
 - 4.) Train the VAE for several epochs.
 - 5.) Extract latent features (z) for all training testSet
 - 6.) Train a Dimple classifier on latent z .
 - 7.) Predict test data labels -
 - 8.) Compute classification matrix -
 - Accuracy -
 - classification.

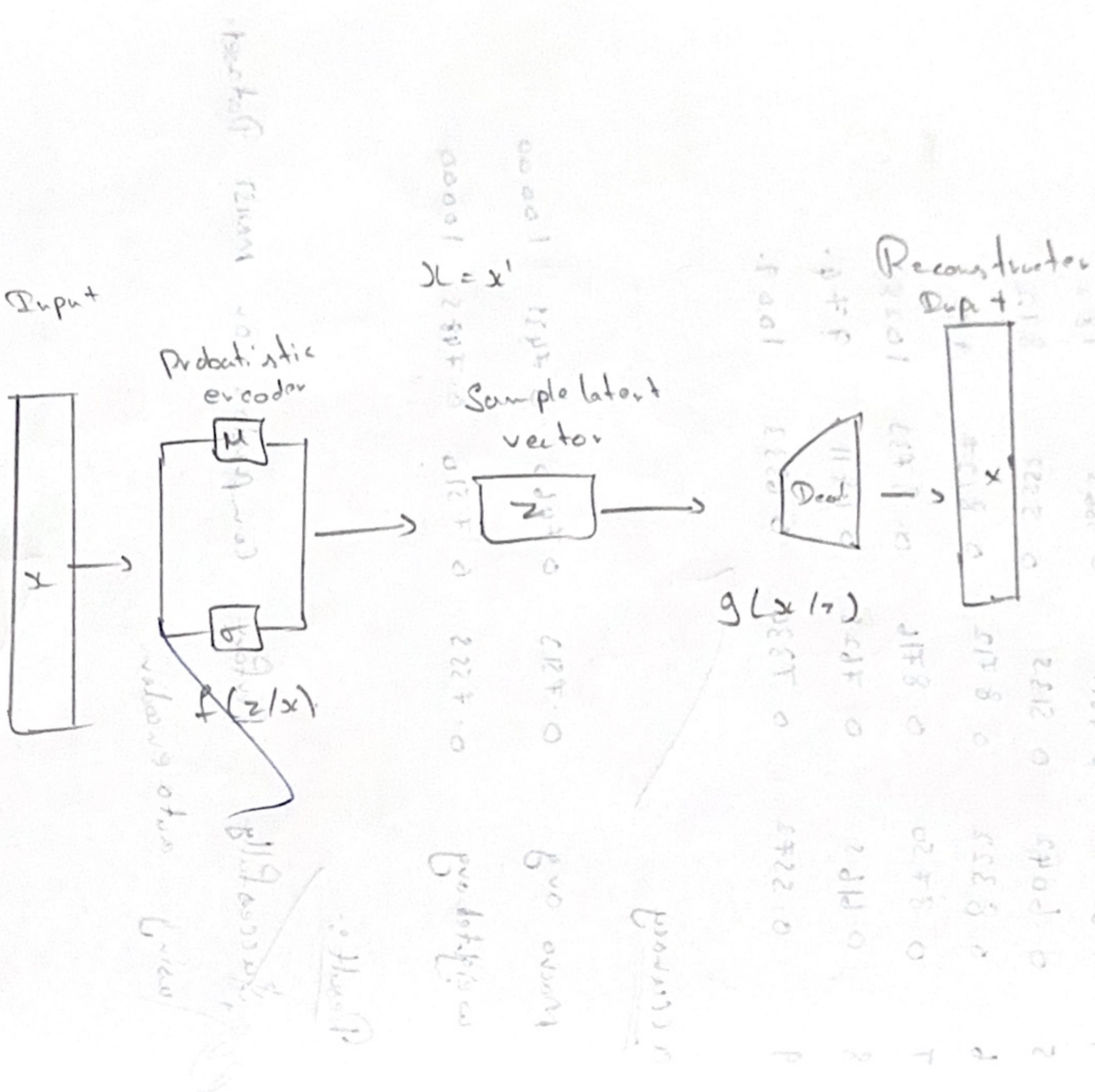


Table B

Accuracy

Classification Report

Precision Recall F-Score Support

	0	0.91	0.94	0.93	980
1	0.95	0.96	0.96	0.95	1135
2	0.87	0.84	0.85	0.85	1032
3	0.87	0.90	0.89	0.89	1040
4	0.89	0.92	0.90	0.90	982.
5	0.85	0.83	0.84	0.84	892.
6	0.90	0.91	0.90	0.90	988.
7	0.91	0.88	0.84	0.84	1029
8	0.85	0.84	0.85	0.85	974
9	0.87	0.80	0.80	0.80	1009.

Accuracy:

	Macro Avg	0.89	0.89	0.89	10000
weight Macro Avg	0.89	0.89	0.89	0.89	10000

Result:

Successfully completed on experiments using - Variational Autoencoder (VAE).

- (a) handwritten digit classification -
- (b) handwritten digit classification -
- (c) handwritten digit classification -
- (d) handwritten digit classification -
- (e) handwritten digit classification -
- (f) handwritten digit classification -
- (g) handwritten digit classification -
- (h) handwritten digit classification -
- (i) handwritten digit classification -
- (j) handwritten digit classification -
- (k) handwritten digit classification -
- (l) handwritten digit classification -
- (m) handwritten digit classification -
- (n) handwritten digit classification -
- (o) handwritten digit classification -
- (p) handwritten digit classification -
- (q) handwritten digit classification -
- (r) handwritten digit classification -
- (s) handwritten digit classification -
- (t) handwritten digit classification -
- (u) handwritten digit classification -
- (v) handwritten digit classification -
- (w) handwritten digit classification -
- (x) handwritten digit classification -
- (y) handwritten digit classification -
- (z) handwritten digit classification -

- Loss = 0.4 -
- weight Macro Avg = 0.89 -
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